



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of: IDEI et al.

Serial No.: 09/508,617

Filed: March 14, 2000

For: PAPER FOR INK JET AND
ELECTROPHOTOGRAPHIC RECORDING

RECEIVED
JAN 26 2004
TC 1700

Examiner: L. Ferguson

Group Art Unit: 1774

Confirmation No.: 8477

Attorney Docket: 000225

APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

January 21, 2004

Sir:

In response to the Final Office Action dated October 31, 2004, Applicants submit this Brief on Appeal. A Notice of Appeal was submitted on even date.

REAL PARTY IN INTEREST

The real party in interest is Mitsubishi Paper Mills Limited, 4-2, Marunouchi-3-chome, Chiyoda-ku, Tokyo, Japan.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

STATUS OF CLAIMS

Claim 2 was canceled and claim 5 was added by the Amendment of September 4, 2003. Claims 1 and 3-5 are rejected. The claims on appeal are 1 and 3-5.

STATUS OF AMENDMENTS

All amendments are believed to have been entered.

SUMMARY OF THE INVENTION

When paper is used for electrophotographic recording (e.g., in a photocopier) the electrical surface resistivity is important. The surface resistivity is a measure of how slowly static charges will migrate across the paper surface due to an electric field created by an uneven distribution of electric charges on the paper. The surface resistivity is analogous to the simple resistance in Ohm's law, which governs how fast electric charges move (i.e., the magnitude of the electric current) as a function of resistance and voltage. In the case of static charges on a surface, a voltage difference between two points is caused by the presence of charge in one area and the lack of charge in an adjoining area: the electric field of the charged area will drive charge across the paper, redistributing the charge to become uniform, which corresponds to uniform gray on a photocopy.

In electrophotographic processes, imaging is based on electrostatic charge patterns. In a photocopier, for example, toner powder is drawn to the pattern of electric charge on the paper, and the toner is then fixed (usually by heat) before the electric charge dissipates. The surface resistivity of a paper is a measure of how slowly a pattern of electric charge will dissipate. To allow time for fixing the image, a high surface resistivity is preferable.

Some treatments that increase the surface resistivity also cause poor absorption of liquid ink, which has caused problems when photocopier paper was used in ink-jet printers (Appellants' specification, page 3, lines 18-26). In the prior art, cationic resins have been added to make paper better suited to ink-jet use, but these cationic resins have decreased the surface resistivity, which makes the paper less useful for photocopiers (page 3, lines 5-18; see also page 4, line 26 to page 6, line 3).

The Appellants found through their research (page 4, line 2) that the subject matter of claim 1 overcomes the problems of the prior art. This subject matter includes a specific range of surface resistivity in combination with a specific range of cationic resin, where the cationic resin has a particular cation equivalent, measured in meq/g.

The Appellants' specification describes (page 3, lines 5-18) how they use a cationic resin to attain good water resistance and to balance the water resistance and the properties related to electrophotographic recording, with a dry adhering amount of 0.5-2.0 g/m² and a cation equivalent of the cationic resin being 3-8 meq/g (page 6, lines 4-12).

Claim 1 recites:

A paper for ink jet and electrophotographic recording which comprises a support having [1] a cationic resin adhered thereto in a dry adhering amount of 0.5-2.0 g/m² and [2] which has a surface resistivity of $1.0 \times 10^9 - 9.9 \times 10^{13} \Omega$, wherein [3] the cationic resin has a cation equivalent of 3-8 meq/g [4] as measured by colloidal titration method.

The colloidal titration method is explained at page 7, lines 12-22.

GROUPING OF CLAIMS

Claim 1 and claim 5 should be considered independently (should not stand or fall together). This is argued for below.

ISSUES

Whether claims 1, 3, 4, and 5 are unpatentable under 35 U.S.C. §103(a) over Fujioka (U.S. Patent 4,279,961) in view of Tanaka (U.S. Patent 5,252,184). As noted above, the Appellants request separate consideration of dependent claim 5.

ARGUMENT: GROUPING OF CLAIMS

Claim 1 and claim 5 should be considered independently because claim 1 recites a range of surface resistivity (number [2] in claim 1 above) which *overlaps* with the range disclosed by the applied prior art, while claim 5 recites a range which *abuts* the range disclosed by the applied prior art. As is argued further below, this difference is relevant to the question of range anticipation, and therefore to patentability.

ARGUMENT: REJECTION OF CLAIM 5

Fujioka. The Examiner relies on Fujioka for disclosing a range of surface resistivity in an electrostatic recording medium. Fujioka's range is stated to be, "most suitably," 10^6 to 10^{10} ohms (col. 1, lines 33 and 41, and col. 5, line 42).

Fujioka discloses that the range of 10^6 to 10^{10} ohms is associated with an amount of coating composition measuring "2 to 20 g/m², preferably about 5 to about 15 g/m² by dry weight" (col. 5, line 43). However, Fujioka's coating composition is *not* the cationic resin which is claimed by the Appellants.

Cationic resin is mentioned at col. 5, line 12 in Fujioka, but this cationic resin is only one possible component of the coating composition (Fujioka says the resin is "usable" in the composition at col. 5, line 12). The most important ingredients of Fujioka's coating composition are zinc oxide powder and coloring agent (the honorable Board is invited to note Fujioka's claim 1). Cationic resin is not even mentioned in any of the examples, and no percentage or amount of cationic resin is disclosed anywhere in the patent. The only disclosure concerning cationic resin is that it is "usable," and that various specific cationic resins are suggested (col. 5, lines 17-35).

Fujioka does not disclose a cation equivalent measured by colloidal titration method.

Tanaka. Tanaka discloses "a cation equivalent value (Cv) in the range of 1.0 to 15.0 meq/g" (col. 2, line 16). Tanaka does not disclose that this cation equivalent is measured by colloidal titration method, as the Appellants claim.

Appellants' Three Main Arguments. Below, the Appellants present their main arguments for claim 5: (1) The surface resistivity recited in claim 5 is not anticipated by Fujioka (or Tanaka either); (2) neither reference discloses the area density of cationic resin recited in base claim 1; (3) Tanaka's amphoteric polymeric is not equivalent to the claimed cationic resin; and (4) the combination is not suggested.

(1) The Claimed Surface Resistivity Range. Claim 1 recites ranges of resin adhering amount, cation equivalent, and surface resistivity. Dependent claim 5, which is argued for first, recites a narrower range of surface resistivity than base claim 1.

The honorable Board is invited to note that for the surface resistivity, the range of claim 5 and the range disclosed by the reference do not overlap, but instead abut (meet at a single point). The surface resistivity ranges abut at the point 10^{10} ohms.

There is a legal question as to whether the Appellants' claimed ranges are anticipated: is a claimed range from A to B anticipated by a disclosed range from B to C? MPEP §2131.03 (Anticipation of Ranges) states, "When the prior art discloses a range which touches, overlaps or is within the claimed range, but no specific examples falling within the claimed range are disclosed, a case by case determination must be made as to anticipation."

Fujioka's Examples. Fujioka has no specific examples falling within the claimed ranges. Indeed, it could not, unless its examples were outside of its range it discloses (since the claimed range and Fujioka's range abut, as mentioned above).

Furthermore, Fujioka's examples are far from the abutment point. Fujioka's examples of surface resistivity are all between 2.9×10^7 ohms (col. 7, line 10) and 5×10^8 ohms (col. 9, line 42), so that the highest exemplary value is twenty times less than the range maximum, which is also the lowest point of the Appellants' range.

The Appellants already argued on the basis of the lack of examples in the Amendment of September 4, 2004 (lines 11-14 on page 11). In the final rejection of October 31, 2003, the Examiner did not traverse the Appellants' argument on the basis of fact.

While the Examiner did not traverse on facts, the Examiner did argue that Fujioka is “not limited to the examples,” and quoted Fujioka's boilerplate statement at col. 6, lines 9-11 to the effect that it is not limited by the examples. The honorable Board is invited to consider that Fujioka's boilerplate was probably directed only to avoiding limitation to its *claims*, and does not constitute any teaching that its disclosed *examples* are in any way unsatisfactory. As noted, all the examples are within the disclosed range, and Fujioka states that surface resistivity range is “most suitably” within the disclosed range. Fujioka also states that values outside the preferred range are unworkable: “a reduced image density will result at ... 10^{11} ohms, and little or no record will be reproduced at 10^{12} ohms [just outside the Appellants' claimed range]. Accordingly [Fujioka's paper has] a resistivity of 10^6 to 10^{10} ohms” (col. 1, lines 33-41).

Thus, Fujioka does *not* teach to move away from the examples into the Appellants' claimed range. Even if Fujioka is not limited to its examples (traversed for the record), it is still limited to its disclosed ranges because the examples are all inside the ranges and there is no teaching to go outside of the disclosed ranges. Thus, the Examiner's assertion that Fujioka is not limited to its examples is respectfully submitted to be irrelevant, even if correct.

Sufficient Specificity. MPEP §2131.03 further states that a legal test for anticipation is that the disclosure have “sufficient specificity” to anticipate a feature. The Examiner has not cited any *specific* example of teaching in the applied art in response to the Appellants' arguments. The rejection of October 31 in ¶ 4 (Response to Arguments), on pages 2-4 of the Office Action, cites only general teachings on this point.

Three Types of Range Interaction. In making a determination under MPEP §2131.03, the honorable Board is solicited to consider that of the three relations of range mentioned by MPEP §2131.03 (touch, overlap, or occur within), the case of touching or abutting, as with claim 5, is the weakest of the three. Mathematically, ranges which abut share only one point, out of an infinity of points in either range, when they abut: for practical purposes, they are disjoint. As discussed above, in this case there is only abutment of the claimed and prior-art ranges.

Tanaka. Tanaka discloses no surface resistivity.

(2) Fujioka's Density Range. Fujioka discloses that its zinc-oxide-and-dye coating composition is applied in a density range from 2 to 20 g/m². As noted above, this is *not* the application density range of cationic resin, but instead is the range of zinc-oxide-and-dye composition. The Appellants claim a density range of 0.5-2.0 g/m², which abuts the disclosed range of the composition; therefore, even *if* the disclosed range were that of cationic resin, there would still be no anticipation. Furthermore, the examples¹ are far from the abutment, 2.0 g/m².

Tanaka's Density. Tanaka, like Fujioka, does not anticipate the Appellant's recited density. Tanaka discloses that its claimed additive (diagramed at the top of col. 11) is added in amount 0.01 to 0.2 by dry weight (col. 5, line 36 and claim 1 at col. 10, line 63). A 25-lb paper² (this is typical photocopier paper) weighs 0.0087 lb/ft². Thus, Tanaka's additive weighs at *most* 0.002 x 0.0087 lb/ft², or 0.00001736 lb/ft². Multiplying by the conversion factors of {1 m² / 10.76 ft²} and by {453.6 g / 1 lb}, this converts to 0.00073 g/m² which is about seven hundred times less than the *minimum* weight recited in claim 1, namely 0.5 g/m².

(3) Resin. Tanaka discloses use of not a cationic resin but an amphoteric polymeric electrolyte. A cationic resin is entirely different from an amphoteric polymeric electrolyte. Tanaka states (col. 1, line 64 to col. 2, line 19) that the amphoteric polymeric electrolyte possesses a cation electric value (Cv) of 1.0 - 15.0 meq/g and an anion equivalent value (Av) of 0.1 - 7.0 meq/g. Thus, as to the amphoteric polymeric electrolyte, both of the anion equivalent and cation equivalent should be simultaneously specified.

Range of Cation Equivalent. The claimed range of cation equivalent is of 3-8 meq/g as measured by colloidal titration method. The Examiner maintains (page 3, line 1) that "as

¹Fujioka's examples of density are 10 g/m² (col. 6, line 42 and col. 8, line 24); 5 g/m² (col. 8, line 21); and 15 g/m² with ten on one side, five on the other side (col. 8, lines 12-14). These values are all at least two and a half times as great as the Appellants' claimed range. Similarly, Fujioka teaches that coating composition is added "... *preferably* about 5 to about 15 g/m² by dry weight" (col. 5, line 44 of Fujioka; emphasis added).

² This is based on a total standard area of 2880 ft²; a standard 480-sheet ream of 24 by 36 inches. The honorable Board is referred to the attached encyclopedia page showing this to be the standard..

measured by colloidal titration” is a method limitation, that deserves no patentable weight. The Appellants respectfully point out that what is claimed is the cation equivalent, and “as measured by colloidal titration” modifies that feature. As the honorable Board knows, a measured numerical quantity depends on what it is measured with: for example, when a length is measured by an inch rule and again by a centimeter rule, the two measurements will differ by a factor of 2.54. Here, in comparing the claims and the prior art, the units are the same (both meq/g) but, even when the units are the same, a measurement can still depend on the measuring instrument used (because all the instruments are not perfect). Therefore “as measured by colloidal titration” should have been given weight by the Examiner.

(4) Combination. Both of the applied references are concerned with paper, but Fujioka is directed to an electrostatic recording paper while Tanaka is concerned only with water-drainage action (col. 1, line 12), and never mentions surface resistivity. The references themselves do not suggest combination.

In response to the Appellants' argument of September 4, 2003 at page 5, line 10, that Tanaka is silent on a paper for ink jet and electrophotographic recording, the Examiner replies that this argument is based on “intended use” and is not claimed (because it comes before “comprises”). However, the Examiner's response is off the point because the Appellants' argument was not related to anticipation, but instead to the motivation for combining the references (page 5 at line 14).

ARGUMENT: REJECTION OF CLAIMS 1, 3, and 4

Claim 1 differs from claim 5 in that the claimed surface resistivity range overlaps the range disclosed by Fujioka, rather than abutting it as is the case with claim 5; the range of claim 1 extends down to 1.0×10^9 ohms. As was noted above, the highest value of surface resistivity in Fujioka's examples is 5×10^8 ohms (at col. 9, line 42), and that is only half of the Appellants' lowest claimed value (i.e., 1.0×10^9 ohms). As with claim 5, there is no teaching to go beyond that example with the disclosed range. Claims 3 and 4 are patentable by depending from claim 1.

For the reasons above, the honorable Board is requested to reverse the rejections.

Respectfully submitted,

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